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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,665	01/29/2004	Ching-Wei Lin	TET-PT049	5412

3624 7590 09/22/2005

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UNITED PLAZA, SUITE 1600
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PHILADELPHIA, PA 19103

EXAMINER

SMOOT, STEPHEN W

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 09/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/767,665

Applicant(s)

LIN, CHING-WEI

Examiner

Stephen W. Smoot

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 8-11 is/are rejected.
- 7) ☒ Claim(s) 5-7, 12-20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4-21-05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office action is in response to application papers filed on 29 January 2004.

Claim Objections

1. Claims 16-20 are objected to because of the following informality:
In claim 16, line 8, delete the redundant appearance of "said"; and
Claims 17-20 are objected to because they depend on claim 16.
Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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3. Claims 1-2, 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Maegawa et al. (US 5,766,989 – from applicant's IDS).

Referring to Figs. 1A-1B and column 5, line 63 to column 6, line 56, Maegawa et al. disclose an example for forming a polycrystalline thin film (5) that includes depositing a microcrystalline silicon layer (2) on a glass substrate (1), depositing an amorphous silicon film (3) on the microcrystalline silicon layer (2), and using an excimer laser beam (4) to irradiate the amorphous silicon film (3) to form the polycrystalline film (5) by using the microcrystals from the microcrystalline silicon layer (2) as seeds.

These are all of the limitations set forth in claims 1-2, 4 of the applicant's invention.

4. Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Szluk et al. (US 4,799,097).

Referring to Figs. 1, 6 and column 4, line 18 to column 5, line 4, Szluk et al. disclose a method of forming a recrystallized silicon region (16) on a monocrystalline silicon substrate (1) that includes depositing a silicon layer (26) over the substrate that can be amorphous silicon, and recrystallizing the amorphous silicon from a seed location (31) by using an energy beam that can be a laser to form a melted region (29).

These are all of the limitations set forth in claim 8 of the applicant's invention.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maegawa et al. (US 5,766,989 – from applicant's IDS) as applied to claim 1 above, and further in view of Yoshimoto (US 6,489,222 B2).

As shown above, Maegawa et al. anticipate claim 1 of the applicant's invention. However, Maegawa et al. lack the further limitation to claim 1 as set forth in claim 3 of the applicant's invention, which is the use of a plastic substrate. Yoshimoto teaches that plastic substrates like polycarbonate, polyallylate, polyether sulfone, or polyethylene terephthalate may be used as a transparent substrate for display devices as an alternative to a glass substrate (see column 8, lines 19-25).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Maegawa et al. by substituting a plastic substrate, as taught by Yoshimoto, for the glass substrate of Maegawa et al. Yoshimoto recognizes that plastic substrates are alternative transparent substrates that

can be used instead of glass (see column 8, lines 19-25) and plastics would also have the advantage of being a lighter weight material than glass.

7. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Szluk et al. (US 4,799,097) as applied to claim 8 above, and further in view of Yoshimoto (US 6,489,222 B2).

As shown above, Szluk et al. anticipate claim 8 of the applicant's invention. However, Szluk et al. lack the further limitations to claim 8 as set forth in claims 9-11 of the applicant's invention, which are the use of a glass substrate (claim 9), the use of a plastic substrate (claim 10), and the use of an excimer laser (11). Yoshimoto teaches that glass substrates or plastic substrates like polycarbonate, polyallylate, polyether sulfone, or polyethylene terephthalate may be used as a transparent substrate for display devices (see column 8, lines 19-25). Yoshimoto also teaches that an excimer laser can be used to form a polycrystalline semiconductor film by laser annealing (see column 1, lines 40-57).

Therefore it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Szluk et al. and Yoshimoto by using a glass substrate or a plastic substrate with an excimer laser for the crystallization, as taught by Yoshimoto, in the recrystallized silicon method of Szluk et al. Yoshimoto recognizes that glass or plastic substrates are transparent materials that can be used in a variety of display devices that utilize thin film transistors (see column 27, line 54 to column 29, line 27). Yoshimoto also recognizes that the use of an

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excimer laser has the advantage of a large spot size that results in high productivity (see column 1, lines 49-57).

Allowable Subject Matter

8. Claims 5-7, 12-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

9. Claims 16-20 would be allowable if rewritten or amended to overcome the objection to claim 16 as set forth in this Office action.

10. The following is a statement of reasons for the indication of allowable subject matter:

- Claims 5-7, 12-14, 16-20 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a process for forming a polycrystalline silicon layer that includes forming a seed by using the steps of patterning an intermediate covering layer, forming an amorphous silicon spacer beside the patterned covering layer, and removing the patterned covering layer; and
- Claim 15 would be allowable because the prior art of record does not teach or suggest, in combination with the other claim limitations, a process for forming a

polycrystalline silicon layer that includes defining a first region and a second region on a substrate, combined with the steps of recrystallizing amorphous silicon in the first region to form a polycrystalline silicon layer and recrystallizing amorphous silicon in the second region to form a microcrystalline silicon layer, wherein Maegawa et al. (US 5,766,989 – from applicant's IDS) (see column 5, lines 46-60) show that a microcrystalline semiconductor layer has the customary meaning, as recognized in the art, of microcrystals dispersed in amorphous silicon that is distinguishable from a polycrystalline semiconductor layer, which has the customary meaning, as recognized in the art, of crystal grains in contact with each other and is further characterized by having grain boundaries.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nickel et al., Okumura, and Chung teach laser crystallization methods for crystallizing semiconductor films.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on M-F (8:00 am to 4:30 pm).

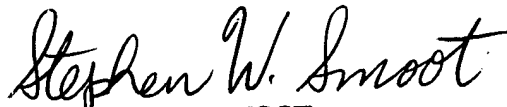
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SWS


STEPHEN W. SMOOT
PRIMARY EXAMINER